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cc Ch. Scientist, CO

10 DOWNING STREET

THE PRIME MINISTER

17 September 1983

Dear Michael.

Thank you again for your first-rate contribution to the Seminar on Science, Technology and Industry at Lancaster House on Monday.

Your paper was not only valuable in itself but also for the way it stimulated other contributions from the floor. Many thanks for all the work you put into it.

I thought the day a success and I shall be giving thought to how we can follow it up in a suitable way. If you have any views on the follow up, I would be delighted to hear them.

Yours ever

Margaret

The Rt. Hon. Michael Heseltine, M.P.

DTC

Mr Heseltine

PRIME MINISTER'S SEMINAR ON SCIENCE, TECHNOLOGY AND INDUSTRY

Prime Minister, in your introduction to the Seminar you referred to the respective roles of Government and industry in developing our national research and development base.

We have heard from Lord Weinstock and Mr Harvey Jones of the ways in wich large companies can foster and stimulate innovation.

I would now like to put the perspective from the MOD.

The MOD is the largest initiator and user of high technology in the country. We take about half the entire output of the electronics industry.

Nearly half of my budget - some £8bn - is spent on the procurement of equipment for the Armed Forces.

Of this almost £2bn will be spent this year on research and development; some 16%, or just over £300M, on research, the rest on specific projects for the Services.

Most of this is spent in industry.

Currently about 70% goes to industrial companies and I expect this percentage to increase.

We therefore support a huge investment in high technology and skilled manpower.

The principal purpose of my Department is to ensure that these assets are used in the most effective way for the defence of this country and its allies.

But there is a very important albeit secondary opportunity in that I must also do all I can to disseminate this skill and knowledge for the benefit of industry at large and the national economy as a whole.

Essentially this means putting those who have the skills and knowledge in touch with those who can exploit it in the market place.

There are a number of ways in which this can be done.

First and most obvious is the direct sale of defence equipment and defence-related products.

Defence sales are now worth over £2bn a year - about 1½% of total UK exports. The sales figures have increased in recent years from £900M in 1978/79 to £2.4bn in 1983/84.

and put Britain into fourth place after the US, France and the Soviet Union. These sales make a very significant contribution to the Armed Forces budgets which reap the benefits of longer production runs and lower prices as a result of sales.

Industry has also for many years exploited defence technologies in a spin off to civil equipment: for example radars for civil aviation, communications, aircraft instrumentation systems and so on.

These direct transfers of defence technology to the market are straight forward.

But we are concerned today with the exploitation of technological innovations which arise in the course of research and development and for which no direct civil market application immediately exists.

Responsibility for exploiting these innovations rests both with MOD and industry. First the MOD.

The Intellectual Property Rights for work which is carried out in MOD R & D Establishments remain in MOD ownership.

The task here is to ensure the best and quickest transfer to the Civil Sector of R & D with possible civil applications.
This can be done in a number of ways.
First the MOD can disseminate information by using the British Technology Group to seek licensees to exploit our technology.
We can also do some licensing ourselves.
Secondly we can contribute to the DTI services which, together, comprise a national industrial data base which industry can call upon.
The maximum possible amount of potentially useful information derived from defence research must be fed quickly into these data bases where it can be tapped by industry.

In addition to the transfer of information we also foster direct contacts between MOD scientists and engineers and their counterparts in industry.
For example there are MOD/industry research committees which monitor technological developments in such areas as aircraft and avionics.
And a significant amount (£40M) of civil work is carried out by the MOD on re-payment from DTI.

As a result of these processes there have been many examples of successful "spin-off" from defence technology to the Civil Sector.
For example:

- the Chemical Defence Establishment at Porton developed charcoal cloth as a lightweight efficient material for respirators.

It is now widely used for medical applications, air filters and contamination monitors;

- the Royal Aircraft Establishment at Farnborough pioneered the use of carbon fibres which are now used extensively in the aerospace and vehicle industries;

- Farnborough's work on improving the performance of military aircraft wings lay behind British Aerospace's success in winning the contract to build wings for the European Airbus;

- The Royal Signals and Radar Establishment at Malvern originated the concept of integrated circuits on a single silicon chip. This led to developments in the semi conductor industry and the proliferation of uses of micro processors for all sorts of civil applications;

- finally the RSRE, in conjunction with Hull University, pioneered the development of liquid crystal displays which are used extensively for digital watches, calculators, and other electronic displays. The world market in these products is now worth £200M a year.

These are outstanding examples of innovative technology, originally designed for defence purposes, which has been translated into successful civil applications.

The problem is that, when it comes to exploitation of the technology, it has too often been foreign firms who have reaped the benefits.

This is true for example in the cases of carbon fibre cloth, the silicon chip and liquid crystal displays.

British scientists and engineers have produced the ideas: and our competitors have produced the commercial applications.
We cannot criticise foreign companies for exploiting research whenever they learn of it.
But it must be important for us to bring our Government financed research results and British industry closer together.
No matter how close the two become there is in the end no substitute for the man or woman who has the eye and the will to see and exploit the opportunities that exist.

We in the MOD are now undertaking an initiative to invite groups of entrepreneurs, with access to venture capital, to organise themselves to seek out marketable inventions within our R & D Establishments.
A pilot scheme is beginning at the RSRE, which is particularly suitable because of the large number of important electronics-based technologies with which it is concerned.
The groups include Cogent, Prutec, Hereford Venturers, the Cranfield Business Institute, Lazards and Barclays Bank.
Current thinking is that these groups will act as a club sponsoring one or two individuals who, with the help of our R & D scientists will produce a portfolio of ideas with commercial potential.
In essence they will act as technology brokers between our Establisments and the hightech industries.
The analogy is with science parks and technology parks, such as that which has been set up at Wavertree, Liverpool.

I intend that this experiment should be followed by similar initiatives at other Establishments, notably the RAE at Farnborough and the Naval Research Establishments. An extension of the idea would be to make space available on site at selected Establishments for the installation of specialist production units to exploit inventions.

Laboratory, computer and other facilities at the Establishments could also be made available on re-payment.

A further area for development is that we must foster more exchanges of people between Government and the private sector.
This applies to the Civil Service as a whole: but a particular objective must be to second Government R & D staff to work on civil exploitation aspects of these research programmes.

Government can also, of course, help with financial incentives.
No doubt these will be covered in detail later in the day but we should bear in mind that a wide range of incentives are available, for example the several schemes that the DTI have for supporting innovation and small firms.

So a lot is being done by Government to make technology available to industry and to produce incentives for it to be taken up. Why, therefore, have we been less successful than we should?

It is no use simply throwing technology at the Civil Sector and expecting it to be picked up.
The odds are that it won't be.
It needs special talents to identify the niche in the market which could be filled by a particular product.
And these are talents which are found in industry rather than in MOD research labs.

I would like to conclude by saying a little about this problem of spin off within industry.

In the case of the electronics industry Sir Ieuan Maddock carried out a very interesting study recently for the Electronics Economic Development Committee.

He was asked to identify what barriers existed to the transfer of technology from MOD-funded contractors to the rest of industry.

He drew a distinction between different kinds of company.

There are the big companies which have been concerned with defence equipment for many years.

The MOD is their dominant customer and their procedures are almost entirely geared to the MOD procurement process.

Sir Ieuan found that there was a feeling in these companies that they did not have the entrepreneurial skills to apply their technology to civil applications.

They tended to believe that this would, in any case, be to the detriment of their main defence business.

There was also a feeling that civil work was of a relatively simple kind and therefore unworthy of their very high quality scientists and engineers.

Sir Ieuan concluded that successful spin off was more likely to be undertaken by other types of company, those which had developed advanced technology for use in the civil area and had then found and exploited a defence application.

These companies tended to be small, entrepreneurial and highly responsive to the market.

Sir Ieuan's analysis was personal and there are no doubt many in this room who would take a different view.

All I would say from personal experience is that I believe that it is the small man who is the most likely to pick up an idea and run with it commercially.
Bigger companies are bound to be cautious about the amount of effort and management time which has to be spent on bringing a good idea to the market because this effort has to be at the expense of the existing parts of the business.
The risks are high and the guarantee of success is not great.
Caution and prudence very often win the day.

One very important issue arises from the question of scale.
Virtually all our Ministry contractors capable of carrying out our development programmes are large companies.
Under long-standing arrangements these companies own the Intellectual Property Rights resulting from this work.
This means that a great proportion of defence derived R & D knowledge is held by the large firms which, in the past, have apparently been rather bad at transferring defence technology even within their own companies, let alone to outsiders.
In other words it is very difficult for the small man to get at the research information which the large companies are not all that likely to exploit except in their direct fields.
Large companies know all too well that it is often better to let someone else carry out the exploitation, a high proportion of which fails and then buy their way into those that succeed.

I shall be looking closely at the rationale for the present system. No doubt I shall be receiving representations on the subject from some of you in this room.

I would conclude by saying that generalisations are dangerous. There are no magic solutions to the problem of spin off. It has proved elusive in other countries as well, including the USA. The UK's particular problems in this area stem from attitudes and institutional structures which are deep rooted and long standing. We can hope for radical change and strive to achieve it but the likelihood is that improvement will be slow and measured in percentage points rather than steep changes. But it is clear that we must make every effort to improve our performance in this area on which our economic and industrial future depends.

I hope I have made it clear that I and my Department take this issue very seriously and stand ready to play our part.